applied to the skin. The animals reacted uniformly, always removing the clips from the side unaffected by the lesion in the brain, and in general not noticing them on the paralyzed side. The natural explanation is, of course, that the animal is unconscious of sensation upon that side. A more detailed account of these experiments may be looked for in an early number of the *Journal of Physiology.*

Preliminary Observations on Some Changes Caused in Nervous Tissues by Reagents Commonly Used to Harden Them. HENRY H. DONALDSON. Jour. of Morphology, Vol. IX., pp. 123-166. Boston, 1894.

This paper casts a shade of doubt over the records of brain weights as they are usually accepted. Unless it is known exactly how any particular brain has been treated before weighing, the weight as recorded may be anywhere between thirty per cent. too large and thirty per cent. too small. In general, bi-chromate of potash solutions swell, while alcohol has a tendency to shrink the brain, and these processes may even pass beyond the limits indicated above. A large number of experiments were made on sheep's brains in a number of different solutions, and the general reactions recorded. To have the research cover as much of the field as possible, these were then repeated upon sharks' brains and upon a series of human brains. Results were in all cases entirely similar. All possible variations of temperature, strength of solution, manner of cutting the brain, degree of dryness, drainage, age of individual, length of time post mortem, etc., were taken into careful account, so that with these data at hand, it is now possible to correct the weight of any given brain to its original weight when fresh.

In the gross changes, however, we have but a small part of the value of this research. The brain swells or shrinks on account of changes taking place in its tissue elements, the nerve cells. The sizes of these may, therefore, be far from normal, as given by the text-books. For consideration of this side of the subject, we must await a subsequent chapter. The paper should be in the hands of everyone who is contributing to neurological science. We confess to some disappointment in not finding an explicit set of directions for obtaining the most nearly correct weight of the brain possible, the outline of a method which would unify and make comparable the work of different observers. Gathering some such statement from the article, we should say that the brain should be weighed fresh, as it comes from the skull, with pia intact. A note should record whether the olfactory bulbs and pituitary body have been retained, and describe where the division between medulla and spinal cord has been made. The state of the blood vessels should also be described. If immediate weighing is not possible, careful note should be taken of all treatment to which it is subjected up to the time at which it is weighed.

An enormous amount of work has been condensed into little more than twenty pages by stating nearly all the results in tabular form. The tables, forty-eight in number, give the briefest and clearest statement of the case possible, and make the data easily accessible for reference.

Brain Preservation, with a Résumé of Some Old and New Methods. PIERRE A. FISH. The Wilder Quarter-Century Book, pp. 385-400, 1 Plate.

This will be found a convenient compendium of some of the better methods of brain preservation, chiefly with reference to

gross specimens. Contributions to the subject have not yet resulted, according to the author, in discovering the ideal method of preparation; but to one who has himself experimented along this line, this will not appear as any unpardonable failure. A number of experiments have been made, and as a result, a new fluid is recommended. Its composition is water and alcohol, each 400 c.c.; glycerine, 250 c.c.; zinc chloride and sodium chloride, 20 gm. each. The specimen, after having its ventricles, and, if possible, its blood vessels, injected with this fluid, is immersed in it for three days, and subsequently in a mixture of equal parts of the fluid and seventy per cent. alcohol for a week or more, when it is finally preserved in ninety per cent. alcohol. Further experiments are under way, which we may hope to hear from later.

The Effect of Stimulation and of Changes in Temperature upon the Irritability and Conductivity of Nerve Fibers. W. H. HOWELL, S. P. BUDGETT AND ED. LEONARD. Journal of Physiology, Vol. XVI., pp. 298-319. London, 1894.

The purpose of this research, somewhat different from similar studies in this field in which attention has centred about irritability of nerve fibers at different temperatures, is to discover the relations of temperature to conductivity, with the hope of throwing some light on the nature of the nerve impulse. By the use of both medullated and non-medullated nerves, it was hoped to learn something also in regard to the function of the medullary sheath.

The method consisted in cutting the nerve and laying it in a small brass tube, around which water of any desired temperature was made to circulate. Experiments were made on both frogs and mammals, rabbit, dog and cat. It has been known for some time that nerves may be warmed or cooled within certain limits to a point where they lose their irritability and conductivity, and that, on bringing them back to a temperature between these limits, they may regain both these properties. The principal additions to our knowledge contributed by the present investigation, refer to the order in which conductivity is arrested by cooling in different classes of nerve fibers, and to something unique in nerve-fiber-physiology, viz., a rapid fatigue of certain fibers at the point of stimulation, hence called by the authors, "stimulation fatigue." Since this is a point by itself, it may be considered first. "Stimulation fatigue" was discovered in connection with stimulation of the sciatic nerve of the cat for the study of the effects of cooling on motor fibers, vaso-constrictor fibers, and secretory fibers to the sweat glands of the paw. In every case, whether cold was applied or not, stimulation ceased to have any effect on the constrictor and secretory fibers, and it looked as though a genuine nerve-fiber-fatigue effect had been demonstrated. Later, it was found that this fatigue existed only at the point of stimulation, and that if the electrodes were shifted a mm. down the nerve, no similar fatigue of motor fibers was present, and since these are medullated and the vascular and secretory are non-medullated, it seemed to point to functional difference due to the medullary sheath. To test this point, stimulation was applied to the rami between the spinal cord and sympathetic ganglia, where both secretory and vaso-constrictor nerves are supposed to possess medullary sheaths. Here the results crossed, the vaso-constrictor fibers being not subject to stimulation fatigue, as predicted, while the secretory fibers were fatigued as before. This breaks down the interesting generalization and leads to the conclusion that the phenomenon of stimula-